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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,392	01/15/2004	You-scop Lee	249/438	4957

27849 7590 01/30/2007  
LEE & MORSE, P.C.  
3141 FAIRVIEW PARK DRIVE  
SUITE 500  
FALLS CHURCH, VA 22042

EXAMINER
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WEINSTEIN, LEONARD J

ART UNIT	PAPER NUMBER
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3746

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/30/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	Application No. 10/757,392	Applicant(s) LEE ET AL.	
	Examiner Leonard J. Weinstein	Art Unit 3746	

**– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 January 2004.  
 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-16 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☒ The drawing(s) filed on 15 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \* c) ☐ None of:  
         1. ☒ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>4/23/2004 &amp; 7/13/2004</u> | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This is the first office action in response to the application for patent identified above filed on 01/15/2004.

#### ***Specification***

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: "passivation layer" on line 20 of page 14.

The attempt to incorporate subject matter into this application by reference to "passivation layer" is ineffective because the term is unclear and one of ordinary skill in the art could not ascertain the meaning of the term.

#### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 3, and 12-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. The term "predetermined inner space" in claim 1 is a relative term which renders the claim indefinite. The term "predetermined inner space" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term fails to limit the pumping chamber and renders claim 1 indefinite.

6. The term "at least about" in claim 3 is a relative term which renders the claim indefinite. The term "at least about" is not defined by the claim, the specification does not

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provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term fails to limit the angle of inclination of the fluid entrance and exit and renders claim 3 indefinite.

7. Claims 12 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation of a "the pumping chamber, the fluid entrance, and the fluid exit are formed" as related to a "substrate" is unclear.

8. The term "passivation layer" in claims 14 and 15 is a term which renders the claim indefinite. The term "passivation layer" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term renders claims 14 and 15 indefinite.

9. Claims 12-13 recite the limitation of "a substrate" in line 2 of both claim 12 and 13, as an element of a <sup>micro</sup>~~micro~~-pump where the elements of a chamber, fluid entrance, and fluid exit are formed and the elements of an insulation layer and a "passivation layer" are placed on top of in layers or connected too respectively. There is insufficient antecedent basis for this limitation in the claim.

10. Claims 14-15 recite the limitation "a passivation layer" in line 2 of claim 14 and 15 both, as an element of a <sup>micro</sup>~~micro~~-pump having "insulation characteristics." There is insufficient antecedent basis for this limitation in the claim.

11. The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1-2, 6, and 10-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Field et al. 6,062,681. Field in figure 1A, teaches all the limitations of the invention as substantially claimed for a micro-pump including: a pumping chamber 30 having a predetermined inner space to be filled with a fluid 24, at least one fluid entrance 18 and at least one fluid exit 14, which are connected to the pumping chamber 2, a heating element, 34 and 35, provided at one side of the pumping chamber to generate bubbles in the pumping chamber by heating the fluid (col. 9 ll. 52-55), and electrodes 164 for applying current (col. 16 ll. 12-15) to the heating element, 34 and 35, wherein the fluid is made to flow into or out of the pumping chamber 30 by expansion and contraction of the bubbles (col. 10 ll. 11-13), and wherein a cross-sectional area of at least one of the fluid entrance, 22 to 18, and the fluid exit (4 to 14) varies along a direction in which the fluid flows; a cross-sectional area of a fluid entrance 14 decreases in a direction toward the pumping chamber 30, with 22 to 18, and the cross-sectional area of the fluid exit, 5 to 4, increases in a direction toward the pumping chamber, 30 of 2; a fluid entrance 18 is provided at one side of the pumping chamber and the fluid exit 14 is provided at an opposite side of the pumping chamber 30 to face the fluid entrance (see figure 1A); the pumping chamber 30 and the heating element, 234 and 235 in figure 5B, each have a rectangular shape; the pumping chamber 30 and the heating element, 34 and 35 in figure 1C, each have a circular shape; the heating element, 34 and 35, is formed of a resistive heating

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material 53; a substrate 45 in which the pumping chamber 30, the fluid entrance 18, and the fluid exit 14 are formed; an insulation layer 43 formed on the substrate 45, wherein the insulation layer 43 constitutes an upper wall (see figure 1A) of the pumping chamber 30, and the heating element, 34 and 35, and the electrodes 164 are formed on the insulation layer 43; a passivation layer 42 having insulation characteristics formed on the heating element, 34 and 35, and the electrodes 164; a heat dissipation layer 49 formed on the passivation layer 42 for dissipating heat, wherein the heat dissipation layer 49 is connected to the substrate 45.

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

16. Claims 3-5 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Field et al. 6,062,681 in view of Peeters et al. 5,751,317. Field teaches all the limitations of the invention as substantially claimed and as discussed above but fails to teach the following limitations taught by Peeters including: a pumping chamber, front section of taper 46 of element 32 to the end of taper 40 of element 30, a fluid entrance 12 and a fluid exit 16 formed

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to have an inclination angle of about 50° (Peeters col. 4 ll. 32-35); a cross-sectional area of the fluid entrance 12 increases, via taper 46, in a direction toward the pumping chamber, front section of taper 46 of element 32 to the end of taper 40 of element 30, and the cross-sectional area of the fluid exit 16 decreases, via taper 40, in a direction toward the pumping chamber, front section of taper 46 of element 32 to the end of taper 40 of element 30; a fluid entrance 12 and the fluid 16 exit are formed to have an inclination angle of about 30° or less (Peeters col. 4 ll. 29-32); the fluid entrance, 44 of 12, and the fluid exit, 40 of 16, each have a pyramid shape; and a fluid entrance 12 and the fluid exit 16 each have a uniform height and a width, via a "cone angle," that varies in a direction in which the fluid flows (col. 4 ll. 22-29). It would have been obvious to one having ordinary skill in the art at the time of invention was made to have combine the configuration of an entrance and exit of Peeters with the electrodes of Field to provide a thermal in-jet printer, in which the fluid flow channel is shaped for impedance control allowing for optimal performance (Peeters col. 1 ll. 5-8).

17. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Field '681. Field teaches all the limitations as substantially claimed for a micro-pump having a heat dissipation layer 49 consisting of a fillet formed from a fluid plastic material but fails to teach a heat dissipation layer formed of metal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the construction of a bubble valve with each corner of the ink delivery channel filled with a fillet made a metal heat dissipation layer for the fluid plastic material of Field to form a more reliable low-leakage seal. It has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice (see MPEP 2144.07 - Art Recognized Suitability for an Intended Purpose).

***Conclusion***

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure are cited on form 892 herewith.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonard J. Weinstein whose telephone number is 571-272-9961. The examiner can normally be reached on Monday - Thursday 7:00 - 5:30.

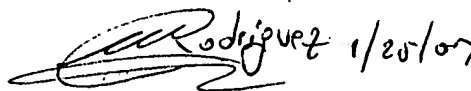
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ehud Gartenberg can be reached on 571-272-4828. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



LJW

01/25/2007



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PRIMARY EXAMINER